

Descriptions of two new Japanese hermit crabs (Decapoda: Paguridae: Diogenidae)

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Abstract.—Two hermit crab species, *Cancellus investigatoris* Alcock and *Paguristes setosus* (H. Milne Edwards), have been reported on a number of occasions from Japanese waters. Neither Japanese taxon has been correctly identified, and both are now recognized as new species. The true *Cancellus investigatoris* appears to be restricted in its distribution to Sri Lanka, whereas the true *Paguristes setosus* is endemic to New Zealand. The Japanese species are described herein as *Cancellus mayoae* new species, and *Paguristes miyakei* new species. Sources of the earlier mistakes are discussed.

As a corollary to a study of the hermit crab fauna of New Zealand (Forest & McLaughlin 1998), two species, *Cancellus investigatoris* Alcock, 1905, and *Paguristes setosus* (H. Milne Edwards 1848) that for many years have been considered part of the Japanese fauna have been reinvestigated. Neither of the Japanese taxa represent the species to which they have been attributed, and both are described herein as new species.

The holotype of *Cancellus mayoae* new species is the specimen from Miyake's (1978) material belonging to the Biological Laboratory of the Imperial Household (BLIH) that was borrowed and illustrated by Mayo (1973). The male paratype of *C. mayoae* has been returned to the National Museum of Natural History, Smithsonian Institution (USNM). All of Miyake's specimens identified as *Paguristes setosus* have been returned to the National Science Museum, Showa Memorial Institute, Tasukuba City (NSMT). Two additional specimens of *Paguristes miyakei* new species are in the collection of the Muséum national d'Histoire naturelle, Paris (MNHN). An indication of specimen size is given by the shield length

(sl) measured from the tip of the rostrum to the midpoint of the posterior margin of the shield.

Cancellus mayoae, new species
Fig. 1A, B

Cancellus investigatoris.—Terao, 1914: 61, unnumbered fig.—Gordan, 1956:305 (lit.).—Miyake, 1960a:71; 1960b:93, ? pl. 46, fig. 8; 1962:93, ? pl. 46, fig. 8; 1978:21, text-fig. 7, ? pl. 4, fig. 2; 1982: 101, unnumbered text-fig., (? not pl. 34, fig. 1); 1991:101, unnumbered text-fig., (? not pl. 34, fig. 1).—Mayo, 1973:54, figs. 23–25.—Miyake & Imafuku, 1980: 2. Not *Cancellus investigatoris* Alcock, 1905.

Holotype.—Specimen described and figured by Mayo (1973: 54, figs. 23–25), ♀ (sl = 7.8 mm), Kannon-zuka-dashi, Sagami Bay, Japan, BLIH 9.

Paratype.—♂ (sl = 4.9 mm), *Albatross* sta 4876, 34°20'N, 130°10'E, 108 m, 2 Aug 1906, USNM 285521.

Diagnosis (after Mayo 1973).—Rostrum reaching approximately to level of lateral projections. Frontal rim (anterior margin of

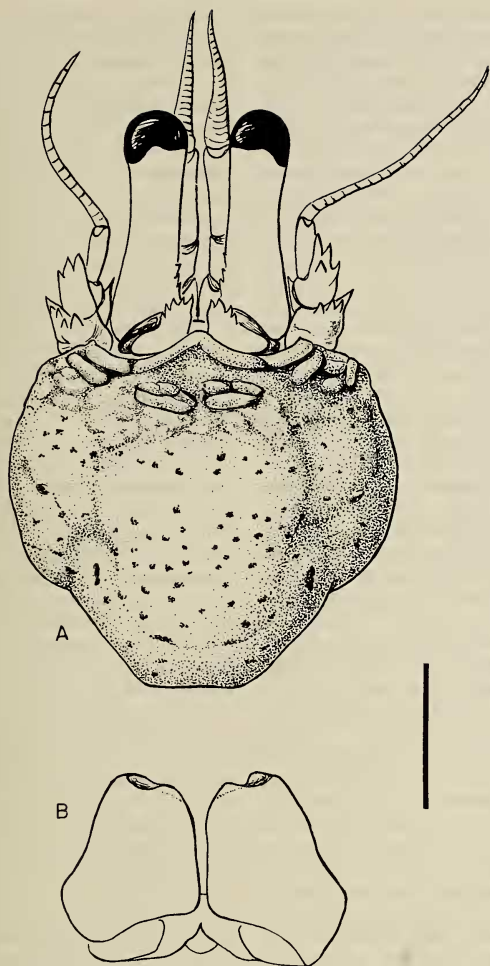


Fig. 1. *Cancellus mayoae* new species, paratype ♂ (sl = 4.9 mm), USNM 285521. A, shield and cephalic appendages; B, coxae of fifth pereopods. Scale equals 1 mm.

Mayo 1973) partially interrupted at level of orbital indentations (Fig. 1A). Ocular peduncles swollen basally, length equaling 0.55–0.65 of shield, mesial margins each with denticles in proximal third. Corneas slightly attenuated. Ocular acicles short, closely-spaced, with 3 or 4 distal teeth. Antennal peduncles with 3 or 4 teeth on distal margin of second segment. Antennal acicles reach or nearly reach distal extremity of fifth peduncular segment; lateral margins each with 2 teeth posterior to terminal point.

Opercular faces of chelipeds and second pereopods depressed, covered with spinose tubercles. Ventrolateral faces of propodi of chelipeds each with 9 smooth, parallel, transverse striae.

Tergite of sixth abdominal segment with transverse depression posterior to mid-length, surface smooth, except for low tubercles on anterolateral margin. Telson unarmed; lateral margins concave in posterior half; terminal margin slightly concave.

Etymology.—This species is named for Barbara Schuler Mayo in recognition of her contribution to our understanding of the genus *Cancellus*.

Color.—Questionable (see Remarks).

Habitat.—Calcareous rock; polyzoan fragments, serpulid worm tubes.

Distribution.—Sagami Bay and Kii Peninsula, Japan; 60–110 m.

Comparison with C. investigatoris.—The ocular peduncles of *C. investigatoris* are much longer with a ratio of peduncular length to shield of 0.77, in contrast to 0.55 in the specimen of *C. mayoae* figured by Mayo (1973) and 0.65 in Miyake's (1978, 1982, 1991) text figure. The corneas are figured as weakly dilated in *C. investigatoris* but narrower in the Japanese species, except for the small male from the *Albatross* (see remarks). The antennal acicles do not reach beyond middle of last peduncular segment in Alcock's (1905) drawing, but reach the distal region in the Japanese specimens. The opercular surfaces of the chelipeds and ambulatory legs are described as finely

granular in *C. investigatoris*, but covered with tubercles, some corneous-tipped in *C. mayoae*. Perhaps most important is Alcock's (1905) stated absence of striae on the ventrolateral surface of the propodi of the chelipeds of *C. investigatoris*; nine distinct striae are present in the Japanese species.

Remarks.—*Cancellus investigatoris* was described by Alcock (1905) from a single specimen collected off the southeast coast of Sri Lanka (Ceylon) in a depth of 58 m. Another specimen, lodged in a fragment of *Porites arenosus*, was recorded by Southwell (1906, 1910) from the west coast of Sri Lanka. Subsequently, the occurrence of this species in Sagami Bay, Japan was reported several times (e.g., Terao 1914, Miyake 1960a, b, 1962, 1978, 1982, 1991; Mayo 1973, Miyake & Imafuku 1980).

During the course of the study of the Coenobitoidea of New Zealand (Forest & McLaughlin 1998), we have examined several undescribed *Cancellus* species and compared these with known representatives of the genus. To this end, we have referred extensively to the excellent monograph of Mayo (1973), in which she very completely described and illustrated, from personal examination, all the species known at the time, except the aberrant *C. makrothrix* Stebbing, 1924. Mayo's (1973) detailed description and illustrations of *C. investigatoris* were based upon a specimen collected from Sagami Bay and subsequently reported upon by Miyake (1978). Mayo's (1973) documentation of the Japanese taxon has been supplemented by a specimen collected from Sagami Bay during a cruise of the U.S. Fish Commission steamer *Albatross* and deposited in the National Museum of Natural History. During our comparative study, it became apparent that the characters of the Japanese species identified as *C. investigatoris* differed notably from those of the type as described and figured by Alcock (1905). As indicated by Mayo (1973) from personal communication with B.K. Tikader of the Indian Museum, the type of *C. investigatoris* is in extremely poor condition.

Thus comparisons between Sri Lanka species and the Japanese taxon are very limited. Alcock's (1905: 77) description lacks many of the details provided by Mayo (1973: 55) for the Japanese taxon. Similarly Mayo's (1973: figs. 23–25) illustrations are much more detailed than Alcock's (1905: pl 5, figs. 8, 8a). Nonetheless, a certain number of characters cited by Alcock, or apparent from his figures, justify the conclusion that the Japanese species described and figured by Mayo (1973), and more recently by Miyake (1978, 1982, 1991) is not *C. investigatoris*, and cannot be attributed to any other known taxon. In the interest of the taxonomic lucidity of the genus *Cancellus* it is necessary to separate the Japanese taxon by providing it with its own distinct identity.

The male specimen from the *Albatross* exhibits the basic characters of this new species, notably the denticles on the proximal third of the mesial faces of the ocular peduncles; the 3 or 4 teeth on the distal margin of each second peduncular segment of the antennae; and the long antennal acicles which reach to or nearly to the extremity of the last peduncular segment. This male differs from the type of *C. mayoae* in the development of the corneas which are weakly dilated rather than attenuated; however, this may be related to its smaller size. Despite the small size of this male, the substantial development of the coxae of the fifth pereopods (Fig. 1B) with broadly open orifices shows that this is an adult specimen and that the definitive form of the coxae has been acquired. The coxae are depressed with their contours forming the shape of a bell.

The figures of *C. mayoae*, particularly the colored figures of Japanese authors, are somewhat contradictory, and for that reason we have included the latter in the synonymy questionably. Terao's (1914) report of *C. mayoae* (as *C. investigatoris*) appears to be the first record of the species in Sagami Bay. Terao's unnumbered figure consists only of the cephalothorax and abdomen

without appendages except for ocular peduncles and the right antennal peduncle, with flagellum, but no antennal acicle distinguishable. Although the ocular peduncles are figured as being slightly broader basally, they are considerably longer than the antennal peduncle; the cornea of the left peduncle is attenuated, that of the right is slightly dilated.

Miyake's figure (1960b: pl. 46, fig. 8), repeated in subsequent editions of the Encyclopedia, is an artist's rendition that shows the ocular peduncles very slightly swollen basally, the corneas very faintly dilated, with the right slightly larger than the left. The antennal peduncles reach only to about mid-length of the ocular peduncles. The antennal flagella are appreciably longer than the one illustrated by Terao (1914). The dactyls of the third pereopods are relatively slender. Miyake's (1978: pl. 4, fig. 2) figure, although bearing a very distinct resemblance to his earlier one, has much stouter ocular peduncles with larger corneas, longer antennal peduncles, and stouter pereopodal dactyls. The length of the antennal peduncles is considerably greater than shown in Miyake's (1978: text-fig. 7) text figure. In Miyake's 1982 publication (reprinted in 1991), his earlier figure (Miyake 1978: text-fig. 7) is reproduced, but his color figure (Miyake 1982, 1991: pl. 34, fig. 1) is of an entirely different animal. Although the color patterns are similar to the earlier colored figures, the ocular peduncles are longer (ratio of peduncular length to shield = approximately 0.70) and the corneas are not as attenuated. Additionally, if the ambulatory legs of the photographed specimen are measured, the dactyls of the second pereopods are as long as the propodi, whereas they are clearly shorter in *C. mayoae* new species.

Paguristes miyakei, new species

Figs. 2A–E, 3A–C

Paguristes setosus.—Miyake, 1978:27, text-fig. 8; not *Paguristes setosus* (H. Milne Edwards 1848).

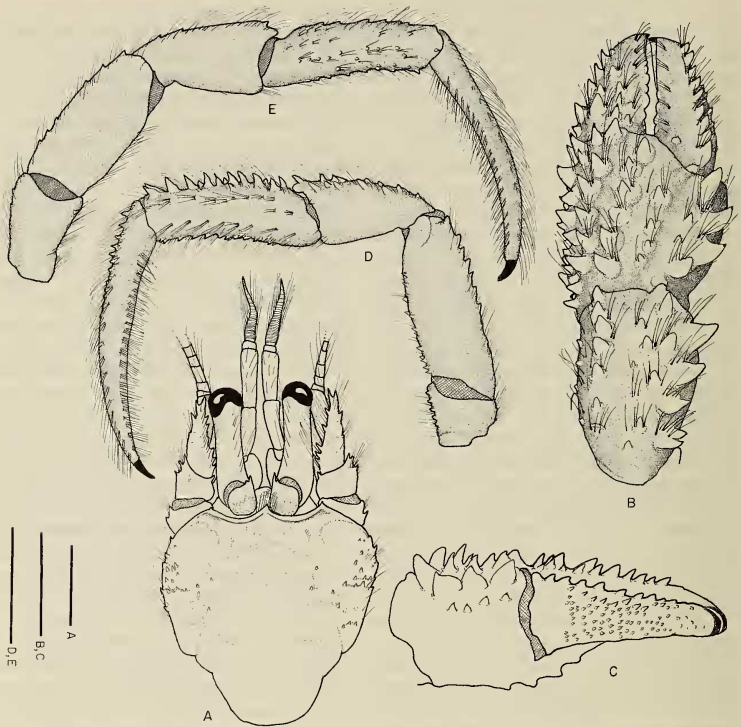


Fig. 2. *Paguristes miyakei* new species, holotype ♀ (sl = 5.5 mm), NSMT CrR 2296. A, shield and cephalic appendages; B, chela and carpus of left cheliped (dorsal view); C, chela of left cheliped (mesial view); D, right second pereopod (mesial view); E, left third pereopod (mesial view). Scales equal 1 mm (A), 2 mm (B, C), and 3 mm (D, E).

Holotype.—♀ (sl = 5.5 mm); east of Ohba-dashi (Bank), Sagami Bay, 180–280 m, 23 Jan 1965, NSMT CrR 2296.

Paratypes.—1 ♀ (sl = 7.2 mm); south-east of Maruyama-dashi (Bank), Sagami Bay; 180–240 m, 19 Jan 1955, NSMT CrR 896.—1 ♀ (sl = 4.5 mm); east of Ohba-dashi (Bank), Sagami Bay, 180–280 m, 23 Jan 1965, NSMT CrR 2295.—1 ♀ (sl = 7.1 mm), Tosa Bay, Feb-Apr 1963, coll. K. Sakai, MNHN Pg 2161.—1 ♀ (7.2 mm), Tosa

Bay, 3–14 Nov 1963, coll. K. Sakai, MNHN Pg 2159.

Description.—Shield (Fig. 2A) longer than broad; dorsal surface rugose, with few spines marginally and/or laterally, and sparse tufts of moderately short setae. Lateral projections broadly triangular, acute, with terminal spine or spinule. Rostrum short, triangular, not reaching level of lateral projections; usually with terminal spinule partially obscured by moderately long

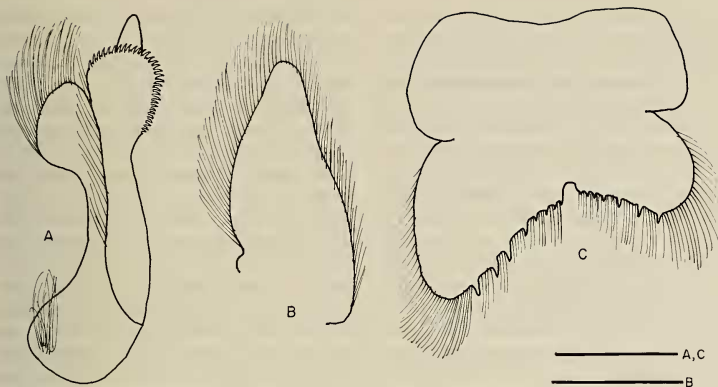


Fig. 3. *Paguristes miyakei* new species: A, paratype ♂ (sl = 7.2 mm), NSMT CrR 896; B, C, holotype ♀ (sl = 5.5 mm), NSMT CrR 2296. A, left first pleopod (external view); B, brood pouch (external view); C, telson. Scales equal 1 mm (A, C) and 3 mm (B).

plumose setae. Branchiostegites each with row of spines or spinules on dorsal margin, sometimes 2 or 3 stronger spines anteriorly, and 1 on anterior margin dorsally.

Ocular peduncles moderately slender; only slightly longer than half length of shield; longitudinal row of moderately long setae on dorsal surface mesially; corneas not dilated. Ocular acicles large, but only partially calcified; with simple or weakly bifid terminal spine.

Antennular peduncles when fully extended overreaching distal margins of corneas by approximately 0.65 to nearly entire length of ultimate segment. Ultimate and penultimate segments with some short setae. Basal segment with slender spine on dorsolateral margin of statocyst lobe, 1 or 2 spinules on laterodistal margin and spine or spinule on ventromesial distal angle.

Antennal peduncles reaching at least to mid-length of corneas, sometimes overreaching distal corneal margin by approximately 0.15 length of ultimate segment. Fifth segment with few scattered short setae. Fourth segment with small dorsodistal spine. Third segment with strong ventrodis-

tal spine. Second segment produced distolaterally, terminating in moderate to strong bifid spine, 1 or 2 spinules or spines on lateral margin distally; dorsomesial distal angle with small spine. First segment unarmed or with small spine at laterodistal margin. Antennal acicle reaching nearly to distal margin of fully extended ultimate peduncular segment, with bifid terminal spine; mesial margin with 0–2 spines distally and 2–4 spines in proximal half, lateral margin with 0–3 spines in distal half. Antennal flagellum moderately long, somewhat longer than carapace; each article with several long randomly-set setae.

Third maxilliped with 1 or 2 spines on ventrodistal margin of ischium; 1 small spine on dorsodistal margin of merus, ventral margin with 4 or 5 spines; carpus with 1 dorsodistal spinule.

Chelipeds subequal; left (Fig. 2B) slightly larger; armature generally similar. Dactyl slightly longer than palm; dorsomesial margin with row of strong spines accompanied by tufts of stiff, moderately long setae, dorsal surface with 1 proximal spine or spinulose tubercle and row of low protuber-

ances with tufts of stiff setae; mesial face (Fig. 2C) covered with small corneous-tipped spines or spinulose tubercles arranged in longitudinal or oblique rows; cutting edge with row of small calcareous teeth in proximal half, corneous teeth distally; terminating in small corneous claw and slightly overlapped by fixed finger. Palm shorter than carpus, dorsoventrally somewhat swollen; dorsomesial margin with row of 4 or 5 strong spines and tufts of stiff setae, dorsolateral margin not delimited, convex dorsolateral face and dorsal surface with 4-6 rows of somewhat smaller spines, each usually accompanied by tuft of stiff setae, 2 or 3 rows extending nearly entire length of fixed finger; mesial surface unarmed or with 2 or 3 transverse rows of low tubercles and tufts of setae; ventral surface with 1 or 2 rows of sometimes prominent spinose corneous-tipped tubercles and stiff setae; cutting edge of fixed finger with row of small calcareous teeth in proximal 0.75, corneous teeth distally; terminating in small corneous claw. Carpus slightly more than half length of merus; dorsomesial margin with row of strong spines, dorsal surface with 2 irregular rows of adjacent smaller spines separated by unarmed longitudinal strip from dorsolateral row of somewhat tuberculate spines; lateral face with row of small spines or tubercles and tufts of setae dorsally, laterodistal margin minutely tuberculate; mesial face with row of spines or tubercles adjacent of dorsal margin. Merus sometimes with 1 or 2 spines at dorsodistal margin; dorsal margin with row of spines decreasing in size proximally and accompanied by tufts of moderately long setae; ventromesial and ventrolateral margins each with row of spines and long setae. Ischium with row of spines or tubercles on ventromesial margin.

Ambulatory legs (Fig. 2D, E) with dactyls 1.25-1.40 as long as propodi; dorsal margins each with row of small corneous-tipped spines in proximal half, accompanied by numerous long bristle-like setae extending to claw (second), or only with bris-

tle-like setae (third); lateral faces each with longitudinal row of sparse tufts of short setae dorsally and ventrally; mesial faces each with longitudinal row of tufts of stiff setae in dorsal half, row of longer and more dense stiff setae adjacent to ventral margin; ventral margins each with row of 20-28 small corneous spines. Propodi somewhat longer than carpi; dorsal margins each with double row of spines, strongest mesially and accompanied by tufts of long stiff setae (second), or only tufts of stiff setae sometimes arising from low protuberances (third); ventral margins each with irregular double row of small spines or tubercles, often corneous-tipped, or low protuberances frequently armed with corneous spinules, strongest on second; mesial faces each with single or irregular double row of small spines or spinulose tubercles accompanied by tufts of setae ventrally, and row of setae dorsally, distal margins with 1 to several corneous-tipped spinules; lateral surfaces each with longitudinal row of setae. Carpi slightly shorter to approximately equaling length of meri; dorsal margins each with irregular double row of strong spines (second) or small dorsodistal spine and 1 or 2 proximal spinules (third); lateral faces each with 1-3 longitudinal rows of sparse tufts of setae. Meri each with dorsal row of small spines (second) or few spinules (third); ventral margins each with double row of spines (second) or unarmed (third) and with tufts of moderately long setae. Ischia with spinules on dorsal and ventral margins, fewer in number on third.

Males with paired gonopores; paired first and second pleopods modified as gonopods. First pleopods (Fig. 3A) with tuft of setae basally on basal lobe; inferior lamella with row of setae on lateral margin, distal margin with row of curved spines extending considerable distance along mesial margin; internal lobe moderately small, with row of long setae on mesial margin; external lobe extending well beyond distal margin of inferior lamella. Female gonopores paired; paired first pleopods well developed. Brood

pouch (Fig. 3B) elongate, moderately to quite slender.

Telson (Fig. 3C) with asymmetrical posterior lobes separated by shallow, moderately broad median cleft; left lobe usually appreciably elongate, subtriangular with rounded apex, terminal margin with row of small spines, increasing in size toward outer angle, not concealed by accompanying long setae; right lobe with terminal margin slightly oblique, with row of small spines, also increasing in size toward outer angle and accompanied by long setae.

Etymology.—This species is named for the eminent Japanese carcinologist, Sada-yoshi Miyake, who provided the first detailed description of the species.

Color.—"Anterior half of carapace and basal segments of chelipeds and walking legs reddish brown; distal two segments of chelipeds and walking legs light reddish brown. Antennules and antennae light reddish brown, dorsal face of eyestalk light reddish brown; ventral face reddish brown" (Miyake 1978: 28).

Habitat.—Sandy mud bottoms.

Distribution.—Sagami Bay, Japan; 150–250 m.

Remarks.—*Paguristes pilosus* (H. Milne Edwards 1836) and *P. setosus* (H. Milne Edwards 1848), two rather aberrant and superficially very similar species endemic to New Zealand waters, have been a source of taxonomic perplexity for more than 150 years. Both were originally described by H. Milne Edwards in the genus *Pagurus* Fabricius, 1775, but subsequently transferred to *Paguristes* Dana, 1851. Although the description of *P. pilosus* was rather brief, the illustration clearly defined the taxon; the type locality was cited as New Zealand. *Paguristes setosus* was described only as very similar to *P. pilosus*; the type locality was cited as New Guinea. The ensuing confusion over the true identities of the two taxa was initiated in part by H. Milne Edwards himself through his incorrect publication of New Guinea as the type locality of *P. setosus*, and additional misinterpretations and

errors by virtually all subsequent carcinologists have compounded the problem. Forrest & McLaughlin (1998) have documented these transgressions as they relate to New Zealand carcinologists and that local fauna. However, as indicated in the synonymy, several authors, perhaps influenced by the incorrect locality assigned to *Paguristes setosus* in the original description, have identified specimens from the Japanese region as this species.

Initially, Ortmann (1892) recorded *P. setosus* from Sagami Bay, indicating that he had chosen to identify his species as *P. setosus* rather than *P. pilosus* because the chelipeds were less setose and the third pereopods more slender, as indicated by H. Milne Edwards (1848) in his original description of the former taxon. Although Ortmann's (1892:28, pl. 12, fig. 9) very diagrammatic figure illustrated only the shield and cephalic appendages, his description clearly showed that he was not dealing with H. Milne Edwards' (1848) species as he stated that the chelipeds were similar. It would appear that Ortmann did not consult H. Milne Edwards' (1836) original description or figure of *P. pilosus*, in which the left cheliped is described and illustrated as very much larger than the right. Yokoya (1933) reported *P. setosus* from several Japanese localities but provided only a reference to Ortmann's description and figure. Similarly Makarov (1938, 1962) paraphrased Ortmann's description and reproduced his illustration (Makarov 1938:167, fig. 67; 1962:158, fig. 67), but indicated that he had no personal knowledge of the species.

Miyake (1978:27, text-fig. 8a, b) presented a detailed description of a species he referred to as *Paguristes setosus* (H. Milne Edwards 1848) from New Guinea, and included the localities reported by Ortmann (1892) and Yokoya (1933) as well as his own. We have examined four of Miyake's (1978) five specimens, now in the collection of the National Science Museum, Shōwa Memorial Institute, as well as two ad-

ditional specimens from Tosa Bay, presented as a gift to the Muséum national d'Histoire naturelle, Paris and identified by M. de Saint Laurent as "*Paguristes setosus* sensu Miyake (1978). Three of Miyake's four specimens for the most part agree with his description of what he interpreted as Milne Edwards (1848) taxon. These, listed by Miyake (1978:28) as Nos 95, 565, and 566, carry NSMT catalog numbers CrR 869, CrR 2295, and CrR 2296, respectively. It is for these five specimens of Miyake's (1978:27) "*Paguristes setosus*," that we establish the taxon, *Paguristes miyakei* new species.

Miyake's specimen No 84 (NSMT CrR 860) represents another species of *Paguristes* that conceivably might be *P. setosus* sensu Ortmann (1892). *Paguristes miyakei* new species has antennular peduncles that overreach the distal margins of the corneas by nearly the entire length of the ultimate segment, whereas Ortmann (1892: pl. 12, fig. 9) illustrated the antennular peduncles as exceeding the corneas by only half the length of that peduncular segment as is seen in CrR 860. However, as previously noted, Ortmann's figure is quite unsatisfactory; his description could apply to any number of species of *Paguristes*. The identities of any of Ortmann's species cannot be definitely established until his type materials are re-examined, a project currently in progress by Dr. Tomoyuki Komai of the Natural History Museum and Institute, Chiba, Japan. However, the equal chelipeds described by both Ortmann and Miyake clearly distinguish their taxon or taxa from H. Milne Edwards's (1848) *P. setosus*.

Miyake (1978) did not specify the specimen (or specimens) illustrated in his text-figures 8a, b. Text-figure 8a does not agree well with any of the specimens examined, including CrR 860; text-fig. 8b does not appear to be of the holotype of *P. miyakei* new species, as the ocular acicles each terminate in a simple spine, as is seen in both paratypes. Miyake described the ocular peduncles of his "*P. setosus*" as distinctly

shorter than the antennal peduncles, but his figure (text-fig. 8b) shows the latter only very slight exceeding the distal margins of the corneas. Only in the male paratype of *P. miyakei* do the peduncles actually extend noticeably beyond the corneal margins.

In Miyake's (1978: text-fig. 8b) figure of the shield and cephalic appendages, the fourth segments of the antennal peduncles each has a strong subdistal ventral spine. Actually the fourth segment of *P. miyakei* new species has a small dorsodistal spine; the strong spine is on the ventrodistal margin of each third segment. Similarly, Miyake refers to the first peduncular segment as having three spinules on the lateral margin. Two or three spinules occur on each lateral margin of the second peduncular segment; each first segment has a single spine on the laterodistal margin only in the holotype.

Miyake described and illustrated (1978: text-fig. 8a) the dactyls of the chelipeds as having three sharp spines on the dorsomesial margin proximally. The dactyls of neither the holotype nor the paratypes of *P. miyakei* new species fit that description. Rather, each has a row of strong, frequently corneous-tipped spines accompanied by stiff setae on the dorsomesial margin. The mesial faces of the dactyls are covered with small corneous-tipped spines or spinulose tubercles, but these are much more numerous and more regularly arranged than suggested by Miyake's figure. In his figure, the dactyl is illustrated as twice the length of the palm; the latter has only 3 spines on the dorsomesial margin, although four are described. The dactyl is actually shorter (1.25–1.35 the length of the palm) in the holotype and both paratypes of *P. miyakei*; the carpus seems to have been omitted in Miyake's figure. Miyake described and illustrated the merus with an unarmed dorsal surface; however, it is actually armed with a row of spines.

Although Miyake described the third pereopods as being unarmed, the ischia of *P. miyakei* new species each has a few dorsal

and at least 1 ventral spinule; the dorsal surfaces of the meri have one or two spinules in addition to a slightly larger dorsodistal spinule. The carpi each has a dorsodistal spine and a couple of proximal spinules. Additionally the propodi each has an irregular double ventral row of spinules or spinulose protuberances, a row of spinulose tubercles is present on the mesial face ventrally, and the mesiodistal margin has at least one corneous-tipped spinule.

Despite being smaller than the male specimen, the female specimen CrR 2296 has been selected as the holotype of *P. miyakei* new species as it best fits Miyake's description in terms of the number of spines on the dactyls of the second pereopods. The number of spines on these dactyls in the two paratypes (CrR 896 and CrR 2295) are fewer. Although Miyake (1978: 28) stated that both posterior telsonal margins had long setae, small spines are present on these margins in all three specimens.

The male specimen from Tosa Bay differs from Miyake's (1978) Sagami Bay specimens only in have the posterior lobes of the telson less asymmetrical. The female specimen is abnormal, in that the tips of the ocular peduncles and corneas, left antennular peduncle and both antennal peduncles have obviously regenerated after an injury. However there is no doubt that it is the same species. The telson of this female is very similar to the illustrated holotype; however, the brood pouch is somewhat more developed.

As it is not possible to ascertain the identities of the specimens reported by Yokoya (1933) from several Japanese localities, for the present we are reporting the distribution of this species as only Sagami Bay at depths ranging from 150–250 m.

Acknowledgments

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